Study of Impacts Caused by Exempting Currently Non-exempt Maine Interstate Highways From Federal Truck Weight Limits

June 2004

Executive Summary

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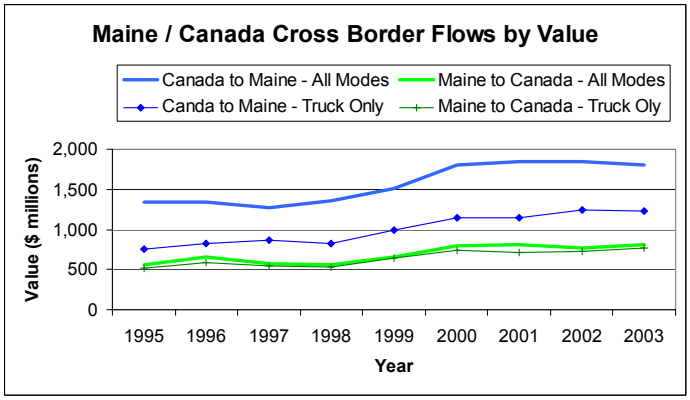
Introduction

Exhibit 1: Maine Trade with Canada 1995- 2003



The U.S. economy has become increasingly reliant on international trade. Transportation systems supporting efficient goods movement and roadway policies maximizing safe, efficient freight transportation are keys to U.S. competitiveness and job retention in an international environment. Since the implementation of the North America Free Trade Agreement (NAFTA), Canada has assumed the role as the primary trading partner with the United States. **Exhibit 1** displays the growth in trade moving across the border between Maine and Canada. Based on figures for the first eleven months of 2003, imports from Canada to Maine remain just under $2 billion, with about 60% of these goods moving by truck. Exports from Maine into Canada are worth about $800 million, with nearly all of this trade moving by truck. Over 90 percent of all freight (by weight) originating in Maine is transported by truck, with 75 percent of originating truck flows moving 250 miles or less. While rail and water modes offer some alternatives, the nature and composition of Maine's regional economy requires heavy reliance on truck transport.

Maine allows gross vehicle weights (GVW) of up to 100,000 lbs. on a 6-x-axle tractor semi-trailer (TST) on state highways. As a result, heavy combination trucks that would otherwise be through traffic on the interstate system divert to state highways upon reaching the non-exempt portions of Maine's interstate highway system.

Exhibit 2: Truck Weight Limits in Maine

Commodity	Special	All Other
Single axle weight limit	24,200 lbs.	22,400 lbs.
Tandem axle weight limit		
5-axle combination	44,000 lbs.	38,000 lbs.
6-axle combination	44,000 lbs.	41,000 lbs.
Tri-axle weight limit		
5-axle combination	54,000 lbs.	48,000 lbs.
6-axle combination	54,000 lbs.	50,000 lbs.
Gross vehicle weight limit		
5-axle combination	88,000 lbs.	80,000 lbs.
6-axle combination	100,000 lbs.	100,000 lbs.

Weight laws applying to state highways in Maine are found in Title 29, Chapter 21 of State Statutes and are summarized in **Exhibit 2**. Maine's weight limit for a 5-axle TST combination depends upon whether the vehicle is carrying "special commodities" as defined in statute. Broadly, special commodities are stone and aggregate products, farm produce and wood products. Six-axle combination trucks may carry up to 100,000 pounds provided they have registered to carry higher weight loads.

***Special Conditions of operation for 6- axle combination trucks*:**

1) Special commodity 6-axle combinations may register for 90,000 lbs. and are allowed a tolerance to 100,000 lbs.; all others must register for 100,000 lbs.
2) The distance between the extreme axles, excluding the steering axle, must be at least 32 feet if carrying "special commodities" and at least 36 feet for other commodities.
3) The distance between the steering axle and the first axle of the tandem must be at least 10 feet.

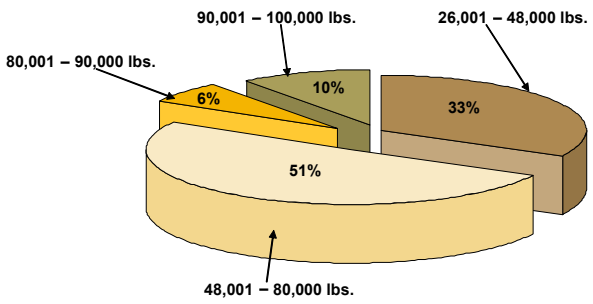
In 1998, Congress provided an exemption from the federal gross weight limit on the Maine Turnpike and a portion of I–95 in Kittery. The remaining interstate routes in Maine remain subject to the federal GVW limit of 80,000.

In 2002, the Maine Department of Transportation (MDOT) contracted with Wilbur Smith Associates to examine the impact a federal weight exemption on currently non-exempt portions of Maine's interstate system would have on safety, pavement and bridges. The study drew on numerous data sources to model how changes in weight policy would affect travel patterns of 5-axle and 6-axle TST trucks moving heavy commodities.

Maine Registered Vehicle Weight

In 2002 there were 138,709 registered commercial vehicles in Maine. Nearly 90% of all registrations are single unit vehicles. More than half (57%) were registered for less than 26,000 lbs. Of the vehicles of 26,000 lbs. or more, only 3,262 (16%) were registered to exceed 80,000 lbs. These statistics reinforce that the vehicle population examined in this study represent only a fraction of the total truck population.

Commercial Vehicles Registered in the State of Maine for GVW of More than 26,000 pounds.



Source: Maine Bureau of Motor Vehicles

Data Sources

Numerous data sources were used to model how changes in weight policy would affect travel patterns of 5-axle and 6-axle TST trucks moving heavy commodities. Three principal data sources were used to understand existing truck traffic (non-exempt scenario) and estimate changes in truck flows if the current federal weight exemption were extended to all Maine interstate highways (study scenario):

1. **Weigh-in-motion (WIM) sites**: Data from ten WIM stations in Maine and two in New Hampshire were used to develop estimates of *Equivalent Standard Axle Loads* (ESAL) and for network calibration. Records for every vehicle with five or more axles were extracted, resulting in the analysis of more than 10.5 million records.
2. **Vehicle classification counts**: Truck count data was taken from 842 vehicle classification stations maintained by MDOT. Counts for 5- and 6-axle TST combination vehicles were used to establish truck volumes on the base network, and to calibrate the truck traffic model.
3. **TRANSEARCH commodity data**: TRANSEARCH data provides volume and value by individual commodity and mode of transport throughout the U.S. This is a proprietary database providing county-level freight flows by mode and commodity, and is considered the premier source for intercity and intra-city commodity flows.

These data were supplemented with information from motor vehicle registrations, interviews with trucking firms and city officials, and with information from weight enforcement officials.

The top commodities after the filtering process are shown in the table of **Exhibit 3**. Several of these commodity groups were aggregated, and one (Secondary Traffic) was dropped from the analysis. More than 95% of Secondary Traffic moving in and through Maine is mixed commodities moving between warehouse facilities. Typically, mixed commodities "cube-out" (use available volume capacity) before "weighing-out" (use available payload).

Exhibit 3: Top Commodity Tons

Commodity Group	Tons
Petroleum or Coal	21,051,444
Lumber or Wood	18,044,677
Clay, Concrete, Glass, Stone	7,233,870
Secondary Traffic	6,768,652
Food or Kindred	4,147,817
Pulp & Paper	2,611,756
Nonmetallic Minerals	1,572,526
Chemicals	1,129,204
Fabricated Metal	868,926
Farm Products	724,813

Four primary commodity groups became the focus of the heavy truck flow modeling:

- Petroleum
- Wood & Paper
- Concrete and Stone
- Food, Farm & Fish Products

Together, these aggregated groups comprise more than 80% of the truck tonnage moving within Maine, or between and through Maine from other jurisdictions that allow vehicles in excess of 80,000 lbs. on their road systems. Flows were also examined at a detailed commodity level and filtered for *"special commodities"* that, under Maine weight laws qualify for a 10% weight bonus. **Exhibit 4** shows the special commodities selected from the database descriptions:

Exhibit 4: "Special Commodities" Extracted from TRANSEARCH

- Concrete Products
- Portland Cement
- Broken Stone or Riprap
- Gravel or Sand
- Dimension Stone, Quarry
- Clay, Ceramic Minerals
- Fertilizer Minerals – Crude
- Misc. Non-metallic Minerals
- Clay, Brick or Tile
- Ceramic Floor or Wall Tile
- Meat, Fresh or Chilled
- Meat, Fresh Frozen
- Meat Products
- Dressed Poultry, Fresh
- Dressed Poultry, Frozen
- Processed Poultry or Eggs
- Creamery Butter
- Ice Cream or Frozen Desserts
- Cheese or Special Dairy Products
- Processed Milk
- Processed Fish
- Maine Products
- Fresh Fish or Whale Products
- Frozen Fruit, Vegetables or Juice
- Frozen Specialties
- Ice, Natural or Manufactured
- Forest Products
- Primary Forest Materials
- Lumber or Dimension Stock
- Misc. Sawmill
- Millwork
- Plywood or Veneer
- Structural Wood Products
- Treated Wood Products
- Misc. Wood Products
- Pulp or Pulp Mill Products
- Fiber, Paper or Pulp board
- Pressed or Molded Pulp Products
- Paper or Building Board
- Ashes
- Metal Scrap or Tailings
- Paper Waste or Scrap

Exhibit 5 on the next page presents a flow diagram of the iterative process used to create the truck traffic model applied to the *Study Network*.

Exhibit 5: Study Network Development Process*

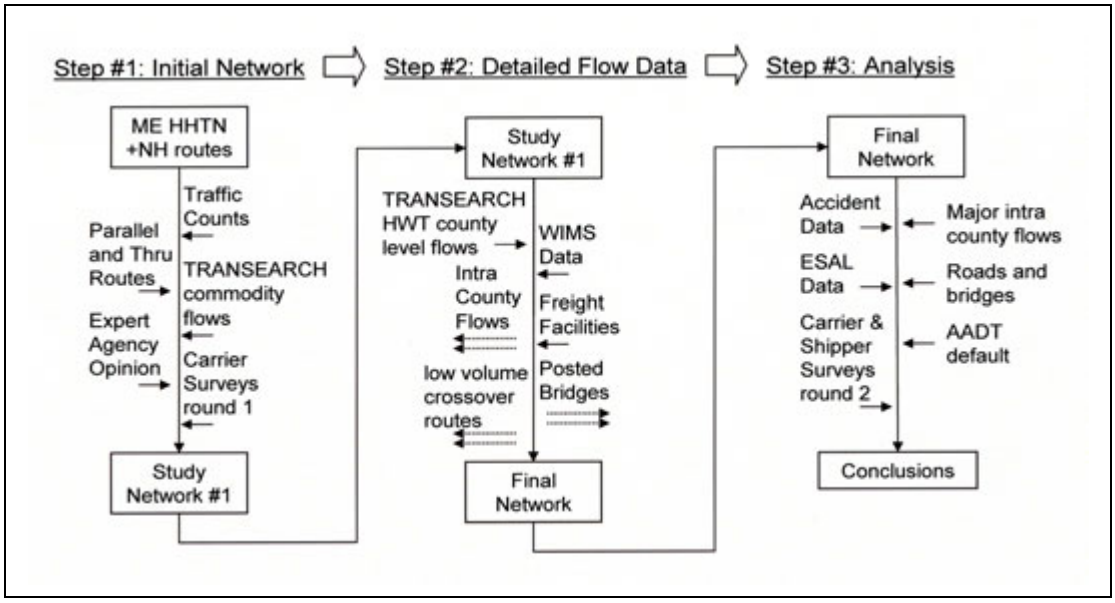
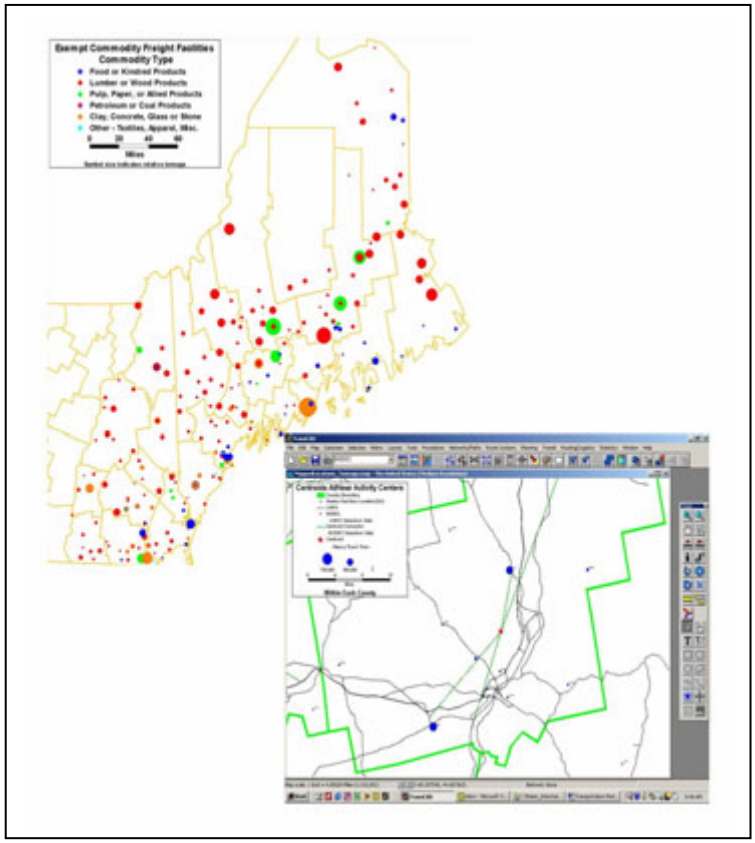


Exhibit 6: Heavy Commodity Freight Facilities



The commodity data purchased by MDOT included locations of major industrial facilities. The *Freight Locator Database* was used to identify facilities potentially receiving or producing products in exempt commodity groups (**Exhibit 6).** These facilities were added to the modeled traffic network as "centroids" for county level truck origins and destinations. A least travel time algorithm was applied to the data, and all truck flows were assigned to two sections of the Maine interstate system:

- I-95/Maine Turnpike
- Non-exempt Maine interstates

The network assignment algorithm was used to load all truck flows to the Maine interstate system and parallel routes were "turned-off." As a result, for any O/D pair requiring a north/south routing through Maine, interstate highways are treated as the only available routes**.**

* Diagram Abbreviations: HHTN = Heavy Haul Truck Network, AADT = Average Annual Daily Traffic

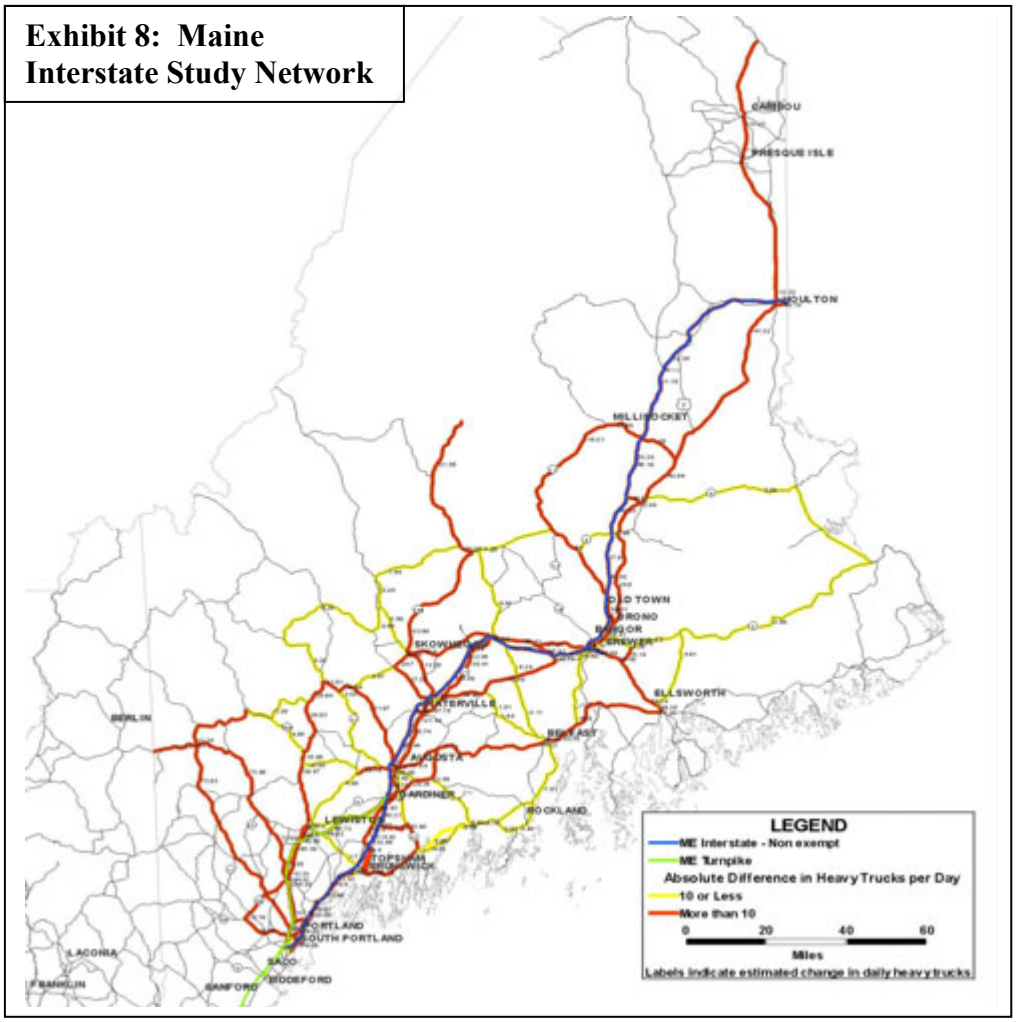
Exhibit 7: Theoretical Truck Count Estimates

Commodity Group	Total Truck Tons	Theoretical 5-Axle TST Count	Theoretical 6-Axle TST Count
Petroleum or Coal	13,135,524	460,896	386,339
Lumber, Wood & Paper	7,117,718	249,744	209,345
Food & Fish Products	1,087,548	38,160	31,987
Stone & Concrete Prod.	1,179,226	41,376	34,683
Total	**22,520,016**	**790,176**	**662,354**

Extending an exemption from federal weight limits to currently non-exempt portions of the Maine interstate system is expected to *increase* 5- and 6-axle TST traffic on I-95. TST truck traffic is expected to *decrease* on state roads and the Maine Turnpike, particularly where it parallels I-95 between Augusta and Portland. Payloads for 5- and 6-axle TST trucks were applied to the commodity tonnages to estimate theoretical truck counts.** The derived truck counts that were later distributed across the study network are shown in **Exhibit 7.**

Exhibit 8 shows the study network used to analyze safety and infrastructure impacts that would result from a federal weight limit exemption on currently non-exempt Maine interstate highways.

Exhibit 8: Maine Interstate Study Network



**A sample of empty 6-axle TST vehicles weighed by the Maine State Police found a wide range of tare weights. The theoretical tare weights used are from the USDOT Comprehensive TS&W Study and phone calls to semi-trailer manufacturers. These tare weights also fell within the range of empty vehicle weights for 5- and 6-axle trucks detected at Maine WIM stations.

Safety Analysis

"Geo-coded" crash data was available from the MDOT that could be used to analyze TST combination truck crashes by functional highway class in Maine. A previous study of truck size and weight noted a strong correlation between crash rates and functional highway class:

> *"Numerous analyses of crash data bases have noted that truck travel, as well as all vehicle travel, on lower standard roads (that is, undivided, higher speed limit roads with many intersections and entrances) significantly increases crash risks compared to travel on interstate and other high quality roadways. The majority of fatal crashes involving trucks occur on highways with lower standards…. The [fatal crash] involvement rate on rural interstate highways is 300 percent to 400 percent lower than it is on other rural roadway types and is generally the same for all vehicle types."*[†]

The geo-code crash analysis divided the 14,244 road segments of the study network into 3 groups of roadway facilities (*each network segment was in one, and only one, group*):

- *Non-Exempt Interstates*, controlled-access facilities expected to gain traffic in the scenario under study (i.e. exempt weights allowed on the interstate). 546 centerline miles (of two or more lanes, running in the same traffic direction).
- *Maine Turnpike,* controlled-access facilities. The northern parallel section of the Turnpike is expected to lose traffic in the study scenario. Crashes from the entire length of the facility - 242 centerline miles were included in the safety analysis.
- *Diversion Routes,* which constitute the rest of the *study network*, and which are expected to lose traffic, under an interstate exemption scenario - 4,538 centerline miles (primarily of two lanes, each running in opposite traffic directions).

Three years (2000–2002) of geo-coded crash data were filtered by recorded vehicle type to extract only crashes involving 5- or 6-axle TST trucks, with GVW registrations of 80,000 lbs. or more, and occurring on a facility in the study network. A total of 1,219 crashes from the three years of data passed both filters, constituting the crash sample.

Exhibit 9: Annual Network TST Crashes

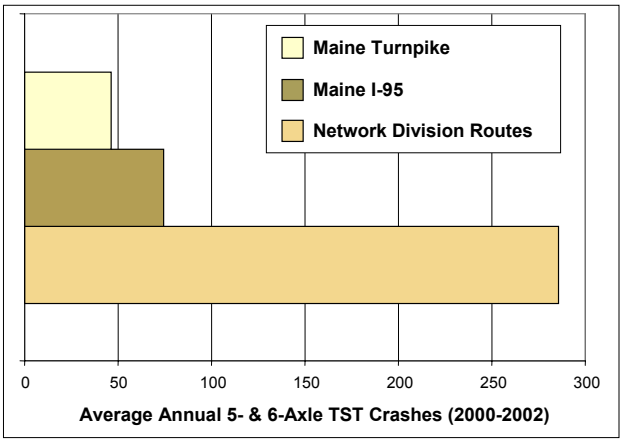


Exhibit 9 shows the resulting annualized number of 5- and 6-axle TST crashes on the Maine Turnpike, non-exempt interstate, and study network diversion routes.

A process was then applied that attached TST average annual daily traffic (AADT) for road segments in the study network to crash data. The process allowed the study team to estimate "crash rates" expressed as TST crashes per "100 million vehicle miles traveled" (HMVMT) by type of highway facility in the study network.

[†] *Comprehensive Truck Size and Weight Study: Vol. III Scenario Analysis*, USDOT, Aug 2000. pp. VIII-3.

Exhibit 10 shows crash rates for 5- and 6-axle TST combinations registered to carry 80,000 lbs. or more. On the Maine Turnpike the computed rate is 27 crashes/HMVMT. The comparable rate for non-exempt Maine interstate highways is 42 crashes/ HMVMT. For all other study network routes the rate is 115 crashes/HMVMT.‡

Exhibit 10: Study Network TST Crash Rates

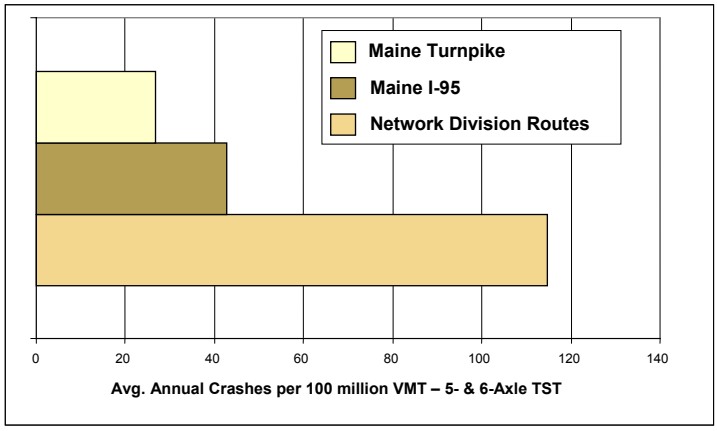
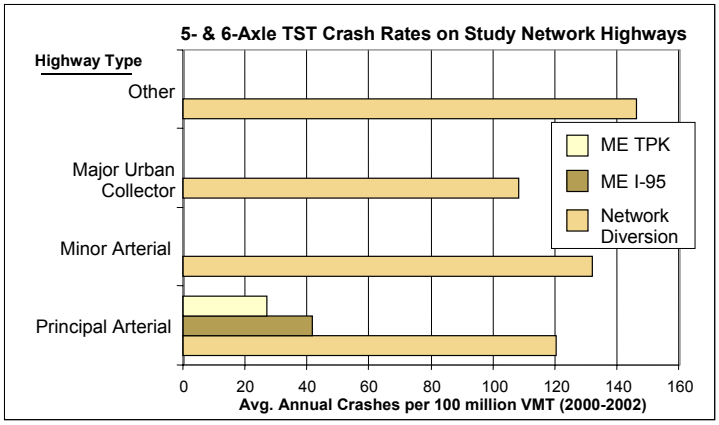


Exhibit 11 shows the crash rates for 5- and 6-axle TST combinations on study network facilities using federal definitions for highway functional class.

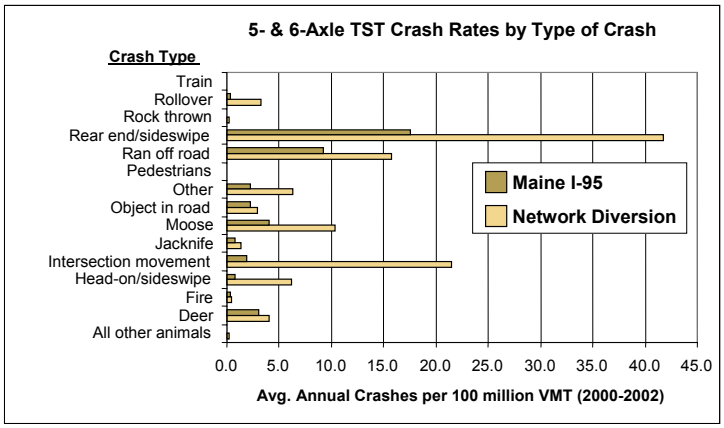
Exhibit 11: TST Crash Rate by Highway Class



The crash rate for 5- and 6-axle TST trucks of 27 crashes/HMVMT on the Maine Turnpike is of particular note, as it currently allows vehicles over 80,000 lbs. Crash rates on non-interstate facilities in the study network, including other principal arterials are at least four times higher than the crash rate on the Turnpike, and more than double the rate on the non-exempt interstate system.

Exhibit 12 displays the crash rates for 5- and 6-axle TST involvements, by type of crash, for non-exempt Maine interstate highways and all other functional highway classes in the diversion road set.

Exhibit 12: Study Network Crash Rates by Type



While diversion route crash rates are higher for all crash types, intersection movement, head-on sideswipe, and read-end sideswipe are all dramatically more prominent. Rear-end sideswipe crashes exhibit the highest crash by type rate for TST vehicles on non-exempt interstate facilities with a rate of 18-crashes/HMVMT. Nonetheless, the crash rate for rear-end sideswipe for non-interstate facilities is more than double, with a crash rate of 42 crashes/ HMVMT.

‡Crash counts and rates are based upon vehicle involvement where each truck (meeting the filter criteria) was counted as one involvement. A collision involving two trucks thus yields two vehicle involvements.

Exhibit 13: Study Network Crash Rate by Severity

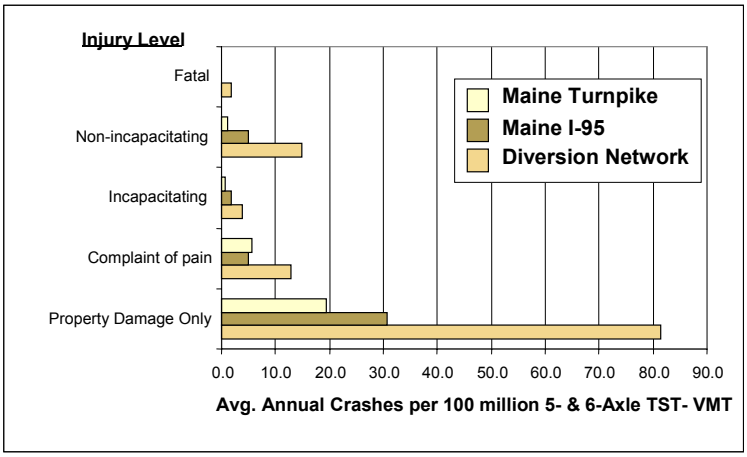
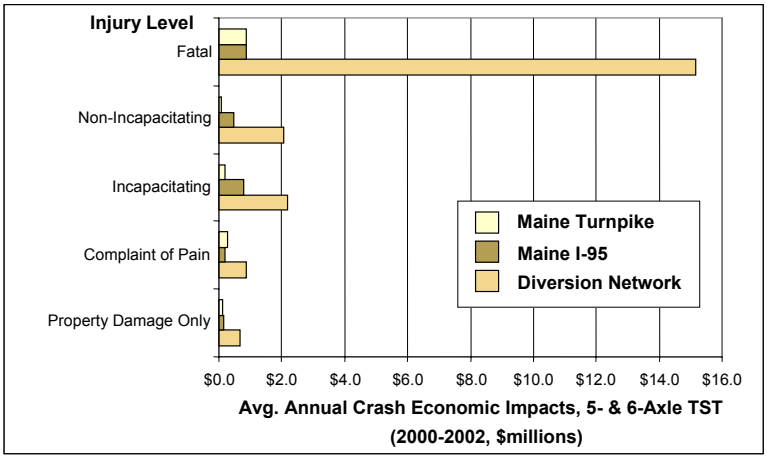


Exhibit 13 displays crash rates for the Maine Turnpike, non-exempt interstate highways and other functional highway classes combined for the study network by crash severity. The fatal crash rate of 0.2 crashes/HMVMT on both the Maine Turnpike and non-exempt portions of the Maine interstate is not visible on the graphic. The fatal crash rate of 1.9 crashes/ HMVMT on the diversion road set is nearly 10 times the fatal crash rate on interstate facilities. Incapacitating injury crashes are nearly seven times more prevalent on diversion roadways than on the Turnpike portions of I-95 and more than twice as prevalent as on non-exempt portions of Maine's interstate highways.

The geo-code dataset supplied by MDOT also contained FHWA defined "economic impacts" associated with vehicle crashes[§]. **Exhibit 14** shows the economic impacts associated with crashes by injury severity. The results are displayed for the three subsets of the study network.

Exhibit 14: Annual Economic Impact by Crash Severity



Fatal crashes involving 5- and 6-axle TST combinations on non-interstate facilities in the study network are estimated to carry an associated annual economic impact of $15 million per year. The associated economic impact on all Maine interstate facilities (Turnpike and non-exempt combined) for TST fatal crashes is $1.8 million per year.

Under the federal weight exemption scenario, it is estimated that non-exempt interstate highways would experience an increase of 3.8 crashes per year. The loss of traffic from other roadways in the study network would result in 0.7 fewer crashes per year on study portions of the Maine Turnpike, and 6.3 fewer crashes on non-interstate facilities.

The safety analysis indicates that if Congress were to extend the current weight exemption on the Maine Turnpike to all currently non-exempt interstate highways in Maine, the net impact to Maine would be a <u>decrease</u> of 3.2 crashes annually. The associated FHWA defined economic impacts would save $356,000 per year.

[§]USDOT, FHWA Technical Advisory T7570.2 Motor Vehicle Accident Costs, October 31, 1994.

Pavement Analysis

The State of Maine currently spends roughly $50 million each year on pavement rehabilitation and preservation. From an operations and maintenance standpoint, vehicle axle loads and environment are the primarily determinants of pavement wear. Changes to vehicle size and weight policy can substantially impact the costs for pavement maintenance and rehabilitation. The objective of the pavement analysis conducted for this study is to relate the impact from changes in axle loadings under the policy scenarios to reflect pavement damage in terms of potential state expenditures. The approach taken in this study uses pavement consumption factors referred to as Equivalent Single Axle Loads (ESAL) to estimate changes in pavement wear. (Note: An ESAL refers to the pavement consumption resulting from a single truck axle carrying 18,000 lbs.).

Using the data sources previously discussed, the study team calculated the incremental differences in truck volumes and associated ESAL loadings on the study network that were observed by model runs of both the base and study scenarios. As expected, if the federal weight exemption in force on the Maine Turnpike were extended to include currently non-exempt Maine interstate highways, 5- and 6-axle TST traffic on non-interstate highways and the Turnpike would decrease, while traffic on other interstate routes would increase. These changes are summarized by functional highway class in the table of **Exhibit 15.**

Exhibit 15: Summary Impacts to Maine Pavements for the Study Scenario[**]

Functional Highway Class	Change in Daily Truck Miles			Change in Daily ESAL Miles		
	5-Axle TST	6-Axle TST	Total 5- & 6-Axle TST	5-Axle TST	6-Axle TST	Total 5- & 6-Axle TST
Major/urban collector	-899	-4,497	-5,396	-3,481	-18,799	-22,280
Minor arterial	-458	-2,292	-2,750	-1,774	-9,579	-11,353
Other principal arterial	-2,219	-11,096	-13,315	-8,588	-46,380	-54,968
Principal arterial interstate	4,001	20,007	24,009	15,486	83,631	99,117

MDOT also provided historical cost details about their pavement resurfacing program, representing the *entire* mileage for each functional system. System-wide programmed pavement maintenance was used to develop *cost per ESAL-mile* normalized for each functional system element, which were then applied to the study network. It was assumed that historically pavement budgets would be programmed to system elements based on their need and that historically maintenance needs would be linked to the number of axle loads (expressed as ESALs) traveling over those systems. The historical budget data indicated shifts in expenditures overtime between functional highway systems. The levels of system allocation were used to develop a high and low cost impact range. The cost per ESAL-mile factors were applied to incremental ESAL loadings (positive or negative) to determine cost impacts for the study scenario. The pavement resurfacing cost impacts are summarized in **Exhibit 16.**

[**] The study scenario assumes a federal weight exemption on currently non-exempt portions of the interstate highway system in Maine. For this analysis "other freeways and expressways was grouped with other principal arterials.

Exhibit 16: Cost Impacts to MDOT Resurfacing from Interstate Weight Exemption

Functional Highway Class	Change in Daily ESAL Mi.	'98-'05 MDOT Resurfacing Cost/Daily ESAL-Mile (Low)	'98-'05 MDOT Resurfacing Cost/Daily ESAL-Mile (High)	Change in MODT Resurfacing Program (Low)	Change in MODT Resurfacing Program (High)
Major/urban collector	-22,280	$11.75	$25.58	($261,890)	($569,853)
Minor arterial	-11,353	$23.89	$47.84	($271,207)	($543,109)
Other principal arterial	-54,968	$19.29	$27.07	($1,060,331)	($1,487,862)
Principal arterial interstate	99,117	$5.97	$9.58	$591,542	$949,635
			Total Savings	**($1,001,886)**	**($1,651,189)**

It is estimated that if the current Turnpike Exemption were extended to all Maine interstate highways the policy would save the State of Maine between $1.0 million and $1.7 million in pavement rehabilitation costs each year.

Bridge Analysis

Bridges represent critical links and potential bottlenecks in highway transport systems for freight. The impacts of truck size and weight on bridge stress and fatigue remains one of the more controversial issues associated with truck regulatory policy, due to the complexity in analyzing a wide variety of structures and the high costs associated with bridge replacement. The current federal bridge formula also represents the limiting factor in current gross weight policy on the federal interstate highway system.

Bridge Impacts Analysis Methodology: Three loading cases were considered:

- Case 1: 80,000 lb. Truck, Base Loading
- Case 2: 88,000 Lb. Truck, 5-Axle Loading
- Case 3: 100,000 Lb. Truck, 6-Axle Loading

Cost impacts associated with a GVW policy change were analyzed from two perspectives:

1. The increase/decrease in normal wear and tear and its associated maintenance cost.
2. Long term effects of the loading with regards to fatigue of the bridge superstructure.

Two groups of bridges were analyzed in conducting the analysis, interstate bridges and non-interstate bridges. For each group of bridges, the study developed truck volumes by vehicle type, which apply for the three loading cases. Cost estimates were developed (in 2003 dollars) for two cost categories: 1) Periodic Maintenance and 2) Major Rehabilitation.

The list of bridges analyzed for the study scenario is shown in **Exhibit 17.** The bridges considered were defined by construction material, structural type, and relative span length. The maintenance cost analysis, was conducted for all structures with bridge decks. The longer term effects of exempt weight vehicles were studied by investigating the change in bridge fatigue life.

Exhibit 17: Maine Bridge Inventory Analyzed for Weight Policy Change

BRIDGE NAME	TOWN NAME	BRIDGE NAME	TOWN NAME
CNR CROSSING	Portland	BARKER BROOK	Richmond
CONGRESS STREET	Portland	VAUGHN STREAM	Hallowell
FORE RIVER	Portland	NEW MILLS	Gardiner
MEADER BROOK	Falmouth	BRIDGE STREET	Gardiner
GILBERT SMALL	Windham	WATER STREET	Hallowell
COLLIER BROOK	Gray	GRIST MILL	Mt Vernon
FOREST LAKE BROOK	Gray	VILLAGE	Vienna
PLEASANT RIVER	Gray	BELGRADE LAKES	Belgrade
MIDDLE RANGE	Poland	WATER ST BR. UNDERPASS	Augusta
RTE 122/OLD HOTEL RD	Auburn	AUGUSTA MEMORIAL BRIDGE	Augusta
FOSTER BROOK	New Gloucester	FATHER JOHN J CURRAN	Augusta
RT #1 UNDERPASS	Brunswick	HARDY BROOK	Farmington
PAUL DAVIS MEMORIAL	Bath	MILL POND	Farmington
WEST APPROACH	Bath	PROCTOR BROOK	New Portland
CORBETT	Salem Twp	MAIN STREET	Norridgewock
WILD RIVER	Gilead	COLLEGE AVE CROSSING	Waterville
PEABODY SCHOOL	Gilead	WYMAN CROSSING UNDERPASS	Fairfield
CRYSTAL LAKE OUTLET	Harrison	MARGARET CHASE SMITH S	Skowhegan
HORRS	Waterford	MARGARET CHASE SMITH N	Skowhegan
PROSPECT AVE	Rumford	WOOLEN MILL	Skowhegan
MORSE	Rumford	MAIN ST BR.	Fairfield
CNRR	Mechanic Falls	CAIN	Clinton
MECHANIC FALLS	Mechanic Falls	PARKMAN RD / FERGUSON STR	Cambridge
SAW MILL	Paris	MAIN STREET	Newport
FROST	Rumford	CORINNA	Corinna
MILL POND	Salem Twp	GUILFORD MEMORIAL	Guilford
CITY FARM CULVERT	Lewiston	MAIN STREET	Camden
JAMES B. LONGLEY MEMORIAL	Auburn	LINCOLNVILLE BEACH	Lincolnville
PARSONS MILL	Auburn	STOCKTON SPRINGS UNDRPASS	Stockton Springs
IRON	Auburn	WARD	Newburgh
MAIN ST. BRIDGE	Auburn	TIN	Bangor
LOCUST ST BRIDGE	Lewiston	MCRR/I-395	Brewer
MAIN STREET	Lewiston	STATE ST.	Bangor
JEPSON BROOK	Lewiston	JOSHUA CHAMBERLAIN	Bangor
FAIRGROUNDS CROSSING	Lewiston	PENOBSCOT BRIDGE	Bangor
DILL	Lewiston	RED	Bangor
NO NAME BROOK CULVERT	Lewiston	MAIN STREET	Ellsworth
NEWOEGIN CULVERT	Sabattus	SMITH BROOK	Lincoln
SABATTUS RIVER	Sabattus	JORDAN MILL	Macwahoc Plt
BRETTUNS POND	Livermore	MILL	Haynesville
FOSS	Leeds	HAYNESVILLE	Haynesville
RTE1 197	Litchfield	STONEY BROOK	Baileyville
POTTERS BROOK	Litchfield	B&ARR/US RTE 1 RR#208-96	Presque Isle
PLEASANT POND	Richmond	CLARK	Presque Isle
FARNHAM BROOK	Pittsfield		

The maintenance costs were calculated based on a five-year maintenance period. When annualized, extending a federal weight exemption to all currently non-exempt Maine interstates is expected to decrease annual maintenance expenditures $335,398 per year.

Major Rehabilitation Costs: The costs for major rehabilitation were based on bridge area and the type of treatments considered included deck replacement; (joint and drainage system replacement), approach slab replacement, repainting, structural repair of corrosion/deterioration, and safety improvements. A major rehabilitation project as described would be necessary every 25 years on average. For purposes of this study, it is assumed that increasing truck weights would result in a second major rehabilitation project being performed on structures over 200 feet in total length. Only two structures fell into this category:

Route #	Town	Bridge Name	Rehabilitation Cost
U.S. 2	Gilead	Wild River	$228,096
Route 108	Rumford	Morse	$235,125
25 – Year Rehabilitation Cost Total			**$463,221**

The total estimated rehabilitation cost for these two structures was $463,221.00. Major rehabilitation costs were based on a 25-year period. Annualized cost for major rehabilitation on the two structures would be approximately $18,500 per year.

The bridge analysis found that extending the federal weight exemption currently in place on the Maine Turnpike would result in annual bridge maintenance and rehabilitation savings of approximate of $317,000 per year.

Impacts to Shippers and Carriers of Heavy Commodities

The consultant team also interviewed 15 companies in Maine that ship or haul heavy commodities, primarily timber, bulk liquids, stone and aggregates, garbage and heavy equipment. In addition to gaining information about preferred routes under various weight policy scenarios, the survey questionnaire also asked companies how they felt about the current federal weight policy on the interstate system in Maine.

Respondents believed that interstate facilities were the safest roadways as these highways are away from population concentrations, are multi-lane, well maintained, and enable overall less time on the roadway for the transportation of heavy or dangerous commodities:

> *"Safety is our biggest concern. The interstate, including the Maine and New Hampshire Turnpikes are the safest roads for heavy vehicle operations and petroleum transport."*

On the whole there was considerable consternation regarding the inability to legally use the non-exempt portions of I-95 in Maine. The primary reasoning from the respondents was that "the interstates were built to carry heavier loads." Companies generally responded that the exemption on the Maine Turnpike saves time and money, observing that interstate highways are "built better." The general comment was that everyone wins; interstates are better able to handle heavy loads and easier to maintain. Respondents believed that weight enforcement is easier as well, noting that weigh-in-motion stations can be used more effectively on exempt interstate routes because they would be the routing of choice for all heavy haulers.

Impacts to Communities


U.S. Route 1 through Searsport*

Thirteen city officials from seven towns in Maine were also contacted for their opinions about the federal weight policy on the interstate highway system in Maine. Questions focused on three areas, impacts of large trucks in the community, complaints to the town or city about large trucks, and anecdotal information about truck crashes in the community.

The issues raised by city officials centered on safety, traffic congestion, air and noise pollution, road maintenance, economic consequence to business, and disturbance of the pleasant village center ambience. Overall, impacts of large trucks are considered very significant. Every local official interviewed expressed strong personal and community support for allowing large, heavy trucks on the interstate system in Maine. One city manager said:

"I don't know a single local official [in Maine] who wouldn't want big trucks on the interstate."


I-95 near Yarmouth*

Police chiefs contacted indicated that routing large trucks through downtowns created unnecessary safety hazards, especially when transporting hazardous materials. Alternate routes like U.S. 1 are heavily used by tourists and often bring traffic through historic city centers. Without exception, local officials expressed strong personal and community support for allowing large, heavy trucks on the interstate system in Maine.

Public Comments

During the month of February 2004, MDOT placed draft reports from the study on its web site. A press release also announced the availability of draft study report, and to provide notice of a public meeting on the study to be held on March 5th.

Public Meeting Response

Twenty-two people representing Maine towns and cities, industry, and the general public signed in at the public meeting held at MDOT headquarters in Augusta on March 5th. After a 45-minute presentation summarizing the study results, attendees were invited to comment. Of the eleven people commenting for the record at the public meeting, all spoke in support of the study findings, and further expressed support for extending the weight exemption on the Maine Turnpike to all interstate highways in Maine. Comments were provided by city officials, industry representatives, and the general public.

* Pictures courtesy of PACTS

The primary points made by those speaking at the meeting included:

- Primary reasons for supporting an interstate weight exemption were to reduce truck traffic on secondary roads where school buses and tourists frequently encounter large trucks, reduce the number of truck trips and improve overall traffic safety in the state.
- City engineers commented that pavement costs for secondary roads may be understated. They pointed out that the study did not include local investments and that overall the level of public investments in secondary roads has been inadequate over the past decade or more. As a result secondary roads have continued to deteriorate over time.
- Heavy truck transport is important to Maine's ability to support NAFTA trade, but tourism is also very important. Many towns on the secondary road system are tourist destinations and having heavy trucks traveling through downtown areas is unnecessary.
- Several city officials indicated that they would have preferred to have the study address emissions, especially the impact of trucking idling in downtown areas.

Written Comments from the Public

In addition to the comments about the study received during the public meeting, MDOT also received 39 written comments by mail or email. Of these comments, 24 opposed increasing weight limits on the interstate system in Maine, 14 favored increasing the weight limit on Maine interstates, and one expressed no opinion but posed several questions about the study conclusions. Letters supporting the interstate weight exemption policy nearly all cited safety and noise concerns resulting from heavy trucks using the secondary road system.

Several comments opposing the Interstate exemption believed that all highways in Maine should be restricted to 80,000 lbs. One respondent suggested raising the Interstate weight limit, but lowering the weight limit on state highways. Several other respondents opposed raising the Interstate weight limit arguing that the exemption would increase diesel fuel consumption and harmful emissions. Sixteen of the 24 comments opposing the study findings were expressed using a form letter containing the following language:

> *"I have just been made aware of the Maine DOT's study on truck traffic on I-95. This report recommends increasing truck weights to 100,000 pounds on the balance of I-95. I oppose this for the following reasons:*
>
> - *100,000 pound trucks are more dangerous.*
> - *100,000 pound trucks will still be operating on state highways. This is not going to solve Maine's problems of truck traffic on local roads.*
> - *This is just another attempt to slowly ratchet up the truck weights to the even more dangerous Canadian weights of 110,000 pounds to support the NAFTA.*
>
> *I am opposed to efforts to expand the number of roads that allow more dangerous, heavier trucks."*

The Towns of Bangor, Brewer, Corinna, Houlton, Lincoln, and Newport also sent letters or resolutions supporting the study findings and a weight exemption on Maine interstate highways.

Issues for Future Consideration

During the study, several issues were discovered related to truck size and weight policy in Maine that merit additional investigation:

- The detailed analysis of WIM data indicate that some roadways experience significant populations of 5- and 6-axle vehicles exceeding legal weight limits. This study did not contemplate the infrastructure costs associated with illegal loads. However, future considerations of GVW policy in Maine should examine enforcement and permitting practices that discourage illegal loads.

- While the population of carriers interviewed was small, some companies reported using retrofitted trailers and walking-spring suspensions. Research on the interaction of commercial vehicles and pavements suggests that truck properties, such as number and location of axles, suspension type, and tire type, are important factors that influence the degree and magnitude of pavement wear. Extending Maine's current weight limits could be done using quid pro quo options that would sunset outdated equipment and provide greater control over the types of equipment used for high weight loads. A permit system is one option that would provide incrementally higher weight limits to equipment that has proven to provide better handling and incur less damage to road infrastructure. Examples of equipment options are:

    - 6-axle TST combinations, with fixed axles (no lift axles) and air-ride suspension.
    - On-board scales capable of providing individual or axle group loadings.
    - Load axles equipped with dual tires (no super singles).
    - Permit issuance could be made conditional upon receiving (and maintaining) a satisfactory safety rating from a Compliance Review within the past year.
    - Other advanced vehicle technologies such as collision avoidance sensors or on-board recorders for hours of service could also be contemplated.

Study Conclusions

Extending the federal truck weight exemption to include currently non-exempt interstate highways in Maine would divert 5- and 6-axle TST combinations over 80,000 lbs. from the some portions of the currently exempt Maine Turnpike and non-interstate highways. **Exhibit 18** summarizes the economic impacts that would result from the contemplated policy change.

Exhibit 18: Exemption Impact Summary

Impacts are rounded to nearest $1,000	
Safety Economic Impacts	$356,000
Pavement (Low)	$1,002,000
Pavement (High)	$1,651,000
Bridge	$317,000
Annual Savings - Low	**$1,675,000**
Annual Savings - High	**$2,324,000**

The economic benefit to Maine resulting from exempting currently non-exempt interstate highways in Maine from federal truck weight limits is an estimated $1.7 to $2.3 million per year.


ENGINEERS
PLANNERS
ECONOMISTS
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